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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/758,113	01/16/2004	Shigeru Unami	023971-0357	4984

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EXAMINER

MAI, NGOCLAN THI

ART UNIT	PAPER NUMBER
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1742

DATE MAILED: 03/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/758,113	<b>Applicant(s)</b> UNAMI ET AL.	
	<b>Examiner</b> Ngoclan T. Mai	<b>Art Unit</b> 1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>5/4/04 &amp; 1/16/04</u> . | 6) <input type="checkbox"/> Other: ____.  |

*RC*

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-2 and 5-6 are rejected under 35 U.S.C. 102(b) as being anticipated by Talmage (US 3,460,940).

Talmage disclose a sintered high purity steel formed by forming a porous green compact from a mixture of carbon and substantially finely divided iron-base powder and heating to sinter the compact, col. 1, lines 12-30. Talmage teaches the sintered compact can then be hot worked (as applied to claim 2) to produce high purity wrought steel composition having carbon 0.1 to 2.5% by mass, col. 1, lines 30-35. Talmage teaches that the mixture contains powders of very fine size such that it can pass through a 325 mesh screen, see col. 6, lines 45-52 and col. 14, lines 18-51. Note that to pass through a 325 mesh screen the powders must have particle size less than 45 microns. Since the starting mixture contains powders having particle size all less than 45 microns, the sintered product produced from such mixture is expected to contain sintered metal particles having particle size substantially the same.

Art Unit: 1742

3. Claims 1, 4, 5, 8, 9, and 12-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Ikenoue et al. (4,588,441).

Ikenoue et al discloses a process for preparing sintered alloy for valve mechanism parts for internal combustion engines by granulating iron powder having particle size not more than 30  $\mu\text{m}$  and powder of other additive (such as graphite, zinc stearate, i.e. lubricant, alloying metal) to an apparent particle size of 30 to 200 microns, forming the granulated mixture into a green compact and sintering in a reducing atmosphere, col. 2, lines 24-55. Ikenoue et al teaches employing graphite in the amount of 0.5% and 1% by weight, respectively in Example 26 and 27.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 3-4 and 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Talmage

Talmage discloses the sintered high purity steel substantially as claimed. The difference between the claims and Talmage are that Talmage does not specifically

Art Unit: 1742

teach the employment of it as part of an internal combustion engine or teeth of a sprocket of a silent chain.

Talmage however in general teaches employing it as ball-bearing steel or the use of it in rolling contact bearing field, col. 2, lines 34-44 and col. 14, lines 67-74. The employment of it as ball bearing member in part of the internal combustion engine or the rolling contact bearing in form of teeth of a sprocket is within the level of skilled artisan and would have been obvious.

6. Claims 9-16 and 18-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Talmage in view of Tsuchida et al. (6,344,169)

Talmage teaches a method for forming high purity steel from iron-base metal powder by providing a blended mixture of carbon and substantially finely divided iron-base powder that has been sieved through a 325 mesh screen, forming a porous green compact of the mixture and heating to sinter the compact, col. 1, lines 12-30, col. 6, lines 45-52 and col. 14, lines 18-51. Note that to pass through a 325 mesh screen the powders must have particle size less than 45 microns. Talmage teaches the compact is sintered at 1200° C (applied to claim 21) and sintered compact can be hot worked (applied to claim 22) to produce high purity wrought steel composition having carbon 0.1 to 2.5% by mass, col. 1, lines 30-35 and col. 9, lines 13-16. Talmage also teach the blended mixture can contain alloying additive in either oxide or metal form (applied to claim 16), col. 5, line 11-25 and col. 10, line 73 to col. 11, line 2.

The difference between Talmage and the claims are that Talmage does not teach employing powder lubricant in the starting powder mixture, compacting the mixture while being heated to a temperature of 100 °C or higher (claim 18), compacting the powder mixture in a die that has been preheated to a temperature of 120 °C or higher (claim 19) and compacting the powder mixture in a die that has been coated with a lubricant (claim 20).

Tsuchida et al teaches employing lubricant in the amount of up to 0.2% by weight in the powder mixture and compacting the powder mixture containing lubricant in a preheated die having a lubricant on inner wall surfaces thereof at elevated temperature, col. 4, lines 9-57. Tsuchida et al teaches that the temperature of the compaction die is at 80 °C or over and the compaction temperature and the temperature to preheat the die are set to be no more than 3 time the melting temperature of the lubricant, col. 5, lines 4-53 and Tables 1 and 2.

Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Talmage by employing lubricant in the powder mixture and compacting them under conditions as taught by Tsuchida et al so that a high density of green compact can be obtained.

Regarding claims 11-12: while Talmage does not specifically teach the employment of it as part of an internal combustion engine or teeth of a sprocket of a silent chain, Talmage teaches employing it as ball-bearing steel or the use of it in rolling contact bearing field, col. 2, lines 34-44 and col. 14, lines 67-74. The employment of it as ball bearing member in part of the internal combustion engine or the rolling contact

Art Unit: 1742

bearing in form of teeth of a sprocket is within the level of skilled artisan and would have been obvious.

7. Claims 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ikenoue et al in view of Tsuchida et al.

Ikenoue et al discloses the method substantially as claimed. The difference between Ikenoue et al and the claims are that Ikenoue et al does not teach compacting the mixture while being heated to a temperature of 100 °C or higher (claim 18), compacting the powder mixture in a die that has been preheated to a temperature of 120 °C or higher (claim 19) and compacting the powder mixture in a die that has been coated with a lubricant (claim 20).

Tsuchida et al teaches compacting the powder mixture in a preheated die having a lubricant on inner wall surfaces thereof at elevated temperature, col. 4, lines 9-57. Tsuchida et al teaches that the temperature of the compaction die is at 80 °C or over and the compaction temperature and the temperature to preheat the die are set to be no more than 3 time the melting temperature of the lubricant, col. 5, lines 4-53 and Tables 1 and 2.

Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Ikenoue et al by compacting the powder mixture under conditions as taught by Tsuchida et al so that a high density of green compact can be obtained.

Art Unit: 1742

8. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Talmage in view of Tsuchida et al as applied to claim 13 above, and further in view of Arvidsson (6,120,575).

Talmage in view of Tsuchida et al teaches the method substantially as claimed. The difference between the claim and Talmage in view of Tsuchida et al. is that the Talmage does not teach granulating the powder metal having fine particle size into secondary particle having size of 180  $\mu\text{m}$  or less.

Arvidsson et al teaches agglomeration of iron-base powder with other additive to prevent powder segregation and provide flowability to the powder. See col. 1, lines 55-63.

It would have been obvious to one of ordinary skill in the art at to modify the method of Talmage in view of Tsuchida et al. by granulate the fine size powder mixture into secondary particle as taught by Arvidsson to prevent segregation during handling and provide flowability to the powder to facilitate the production of the powder into desire product.

As for the size of the secondary particle, it has been established that where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable range by routine experimentation. See *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955); *In re Hoeschele*, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969); *Merck & Co. Inc. v. Biocraft Laboratories Inc.*, 874 F.2d 804, 10 USPQ2d (Fed.cir), cert. denied, 493 U.S. 975 (1989); *In re Kulling*, 897 F.2d




Art Unit: 1742

1147, 14 USPQ2d 1056 (Fed. Cir. 1990); and *In re Geisler*, 116 F.3d 1465, 43 USPQ2d 1362 (Fed. Cir. 1997).

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ngoclan T. Mai whose telephone number is (571) 272-1246. The examiner can normally be reached on 9:30-6:00 PM Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Ngoclan T. Mai  
Primary Examiner  
Art Unit 1742

n.m.